

# PATENT ABSTRACTS OF JAPAN

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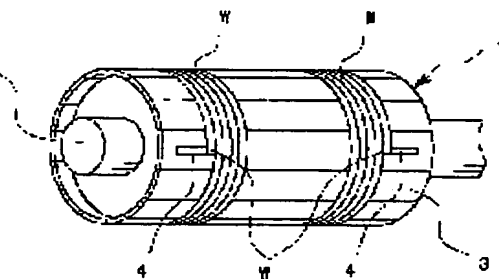
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## (54) METHOD FOR STICKING BELT-LIKE RUBBER MEMBER AND MOLDING DRUM

(57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a method for easily sticking a belt-like rubber member by which the belt-like rubber member can be easily stuck on a molding drum and released from it without deforming the belt-like rubber member to excess and the molding drum.

**SOLUTION:** The method for sticking the belt-like rubber member in which after a part of an unvulcanized belt-like rubber member is pressed and fixed on a rubber part provided on the surface of the molding drum, the belt-like rubber member is wound on the outer peripheral face of the molding drum and the rubber part consists of a rubber composition containing 60-100 pts.wt. butyl rubber to 100 pts.wt. rubber and with a JIS A hardness of 40-60 and the molding drum are provided.



## LEGAL STATUS

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**CLAIMS**

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[Claim(s)]

[Claim 1] JIS to which said rubber section carries out 60-100 weight section content of the butyl system rubber to the rubber 100 weight section while twisting said band-like rubber member around the peripheral face of a shaping drum, after forcing a part of unvulcanized band-like rubber member on the rubber section prepared in the front face of a shaping drum and fixing Approach the band-like rubber member which A degree of hardness becomes from the rubber constituent which are 40-60 should stick.

[Claim 2] The approach the band-like rubber member according to claim 1 said whose band-like rubber member is a rubber member for tires should stick.

[Claim 3] The approach the band-like rubber member according to claim 1 said whose band-like rubber member is the rubber member for inner liners of a tire or a rubber member for side treads should stick.

[Claim 4] The approach the band-like rubber member of a publication should stick to any 1 term of claims 1-3 whose full speed which said band-like rubber member twists is a part for 30-200m/.

[Claim 5] The approach the band-like rubber member of a publication should stick to any 1 term of claims 1-4 whose skin temperature of the band-like rubber member at the time of forcing said a part of band-like rubber member on the rubber section prepared in the front face of a shaping drum is 40-170 degrees C.

[Claim 6] The approach the band-like rubber member of a publication should stick to any 1 term of claims 1-5 whose thickness the width of face of said band-like rubber member is 5-40mm, and is 0.5-4mm.

[Claim 7] JIS to which it is the shaping drum which sticks a band-like rubber member, the rubber section is prepared in the peripheral face, and the rubber section carries out 60-100 weight section content of the butyl system rubber to the rubber 100 weight section Shaping drum on which A degree of hardness consists of a rubber constituent which are 40-60.

[Claim 8] The shaping drum according to claim 7 whose die length of the drum hoop direction of said rubber section is 60mm or less.

[Claim 9] The shaping drum according to claim 7 or 8 which formed the mold release means which can be freely taken in the direction of the diameter of a drum in the peripheral face of said shaping drum.

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the approach the band-like rubber member which can perform the attachment and mold release to a shaping drum easily should stick, and a shaping drum, without making a band-like rubber member deform too much in more detail about the approach a band-like rubber member should stick, and a shaping drum.

[0002]

[Description of the Prior Art] Usually, in manufacturing a tire, the various unvulcanized band-like rubber members which constitute a tire are twisted around a shaping drum one by one, and are stuck, and an unvulcanized tire is produced. For example, an unvulcanized tire is produced by twisting the band-like rubber member which becomes a shaping drum from the rubber member for inner liners which used isobutylene isoprene rubber as the principal component first, twisting members, such as a carcass, a rim cushion, and a side tread, one by one on it, and assembling. Moreover, the band-like rubber member which becomes a shaping drum from the rubber member for side treads conversely at the beginning is twisted, members, such as a rim cushion, an inner liner, and a carcass, are twisted one by one on it, and an unvulcanized tire is produced.

[0003] In order to twist a band-like rubber member around a metal shaping drum first in this process, after forcing the point of a band-like rubber member on the shaping drum front face and fixing, it is necessary to rotate a shaping drum and to stick. Moreover, in order to remove the first stage story unvulcanized tire which is the unvulcanized tire and half-finished products which were produced from a shaping drum by one side, the amount of [ of the band-like rubber member fixed to the shaping drum ] point needs to separate from a drum front face easily.

[0004] In order to solve this technical problem conventionally, hard chromium plating was performed to the front face of a shaping drum on which the point of a band-like rubber member is stuck, smooth nature was raised and the approach of arranging suction means, such as vacuum putt, and carrying out suction adsorption of the band-like rubber member was performed.

[0005] However, practical use was so difficult that there are various problems by these approaches and the width of face of a band-like rubber member became small especially. Since the adhesion of the rubber per unit area is hard to be fixed to a shaping drum small when performing hard chromium plating, while needing a larger attachment area, to the attachment side, the band-like rubber member needed to be forced by the strong force, and rubber needed to stick it to the shaping drum side firmly. If it does so, it will deform so that thickness may become small, and compared with other parts, the configuration and thickness of a band-like rubber member will change, and the part on which the band-like rubber member was pushed strongly will have the fault referred to as becoming an ununiformity, and will have led to generating of the Ayr \*\*\*\* after tire vulcanization. Moreover, there was a problem that time and effort will require the need of always maintaining the plating front face of a shaping drum flat and smooth, for \*\* and its maintenance.

[0006] In the approach of making carry out suction adsorption and on the other hand, sticking in vacuum putt etc., when the size of the tire to manufacture changes and the attachment location of a band-like rubber member changes, according to it, the location of vacuum putt is also changed, or the vacuum putt which rubber does not contact had to be made to blockade and starting workability has got worse [ time and effort ]. Furthermore, the band-like rubber member was attracted by the vacuum pad, and deformed too much, and the problem of becoming the cause of failure of the Ayr \*\*\*\* with the completion tire after vulcanization also had it.

[0007] Then, these people are JP,7-40460,A, prepared the rubber section which gave mirror plane finishing

in the front face of a shaping drum, and have proposed the approach of forcing and sticking the tip of a band-like rubber member on the rubber section. However, when this approach was used, an approach it might occur that mold release at the time of a band-like rubber member being firmly stuck on a rubber member, and removing the produced unvulcanized tire cannot be performed smoothly, and always could perform easily attachment and mold release of a band-like rubber member was desired.

[0008]

[Problem(s) to be Solved by the Invention] Therefore, the technical problem of this invention is to offer the approach the band-like rubber member which can perform the attachment and mold release to a shaping drum easily should stick, and a shaping drum, without making a band-like rubber member deform too much.

[0009]

[Means for Solving the Problem] JIS to which said rubber section carries out 60-100 weight section content of the butyl system rubber to the rubber 100 weight section while twisting said band-like rubber member around the peripheral face of a shaping drum according to this invention, after forcing a part of unvulcanized band-like rubber member on the rubber section prepared in the front face of a shaping drum and fixing The approach the band-like rubber member which A degree of hardness becomes from the rubber constituent which are 40-60 should stick is offered.

[0010] Moreover, according to this invention, the approach the rubber member for tires and the aforementioned band-like rubber member which is the rubber member for inner liners of a tire or a rubber member for side treads still more preferably should stick [ said band-like rubber member ] is offered.

[0011] Moreover, JIS to which according to this invention it is the shaping drum which sticks a band-like rubber member, the rubber section is prepared in the peripheral face, and the rubber section carries out 60-100 weight section content of the butyl system rubber to the rubber 100 weight section The shaping drum on which A degree of hardness consists of a rubber constituent which are 40-60 is offered.

[0012] Moreover, according to this invention, the aforementioned shaping drum whose die length of the drum hoop direction of said rubber section is 60mm or less is offered.

[0013] Furthermore, according to this invention, the aforementioned shaping drum which formed the mold release means which can be freely taken in the direction of the diameter of a drum in the peripheral face of said shaping drum is offered.

[0014]

[Embodiment of the Invention] Hereafter, it explains to a detail, referring to a drawing about the configuration of this invention. Drawing 1 is a perspective view in the condition of the outline of an example of the shaping drum of this invention having been shown, and having twisted the band-like rubber member.

[0015] The shaping drum 1 is attached so that expanding and contracting in the direction of the diameter of a drum may be attained in a segment 3 by the driving means of the arbitration which is not illustrated to the drum driving shaft 2 held free [ the rotation extended horizontally ]. Although especially the driving means of a segment 3 is not limited, the well-known driving means which changes the driving force of drum shaft orientations into the driving force of the direction of the diameter of a drum through a link mechanism or a ramp can be used for it, for example. A segment 3 consists of metallic materials, such as an aluminium alloy, and mold release processing is performed so that adhesion of rubber can be avoided to the outside surface. What is necessary is to perform surface treatment by the fluororesin or silicone resin, or just to perform split-face processing as this mold release processing, for example.

[0016] The rubber section 4 is arranged in the part where the point W1 of the band-like rubber member W contacts at least by the front face of a segment 3, and the point W1 of the band-like rubber member W is forced and fixed to it here. This rubber section 4 is JIS while carrying out 60-100 weight section content of the butyl system rubber to the rubber 100 weight section. A degree of hardness consists of vulcanized rubber constituents with small 40-60, and degree of hardness. Thus, also in case the adhesion of the unvulcanized band-like rubber member W and the vulcanized-rubber constituent of the rubber section 4 improves, an unvulcanized tire is produced while the band-like rubber member W becomes that it sticks to the rubber section 4 easily, and is easy to be fixed to it, and it is removed from the shaping drum 1 with constituting, the very good shaping drum of being released from mold easily is obtained. Furthermore, since it sticks easily even if it does not push too much, deformation of the band-like rubber member W can be controlled. Moreover, with any ingredients other than the above-mentioned rubber, such as urethane resin, it was lacking in compatibility with rubber, was stabilized in it, and sticks to it, and the engine performance is not obtained.

[0017] As butyl system rubber of this invention, isobutylene isoprene rubber (IIR), BUROMO isobutylene isoprene rubber, chloro isobutylene isoprene rubber, etc. can be mentioned. Moreover, the diene system rubber of arbitration other than butyl system rubber can be blended, for example, natural rubber (NR), polyisoprene rubber (IR), styrene butadiene rubber (SBR), polybutadiene rubber (BR), acrylonitrile-butadiene rubber (NBR), etc. can be mentioned.

[0018] In addition, it will be it hard coming to release a band-like rubber member from mold from the rubber section that the loadings of butyl system rubber are under 60 weight sections to the rubber 100 weight section. Moreover, JIS If the rubber section is too soft in A degree of hardness being less than 40, it is hard coming to release a band-like rubber member from mold from the rubber section and it exceeds 60 conversely, the rubber section is too hard, adhesion declines, and a band-like rubber member will stop being able to stick to the rubber section easily.

[0019] Next, how the band-like rubber member using the above-mentioned shaping drum 1 should stick is explained. First, it is made to force and fix to the rubber section 4 of the shaping drum 1 of a diameter expansion condition, as shown in drawing 1, the part W1, i.e., the point, of the band-like rubber member W. Here, the band-like rubber member W of the shape of a strap of one pair of right and left extruded through the dice from the extruder or the rubber catapult is twisted toward the inside from a drum cross direction outside. Although it is the expanded sectional view showing the part of the segment 3 which laid the rubber section 4 underground, the band-like rubber member W is forced on the rubber section 4 with a roller 11, a point W1 adheres to the rubber section 4, and drawing 2 is fixed. This roller 11 is attached at the tip of the elastic rod 13 from the cylinder 12.

[0020] Furthermore, where the band-like rubber member W is forced with a roller 11, shifting the location to which the band-like rubber member W is supplied to drum shaft orientations, the shaping drum 1 is rotated, the band-like rubber member W is twisted around a shaping drum, and is stuck, and, finally the back end section of the band-like rubber member W is cut. Then, if other band-like rubber members are twisted one by one and fabricate an unvulcanized tire, the shaping drum 1 will be changed into a diameter reduction condition, and will be taken out.

[0021] In the approach the band-like rubber member of this invention should stick, although especially manufacture conditions etc. are not limited but it can set up suitably, as for the rate which the band-like rubber member W twists, it is desirable to consider as a part for 30-200m/as full speed to which the band-like rubber member W is supplied. Manufacture effectiveness can be raised by 30m thing it is supposed with the above by /that it is high-speed, and it is desirable especially when especially the band-like rubber member W is a strip member with small width of face. On the contrary, by 200m thing considered as the following by /, it is too high-speed and fault, like the band-like rubber member W comes floating according to a centrifugal force can be prevented.

[0022] Moreover, it is desirable to set the skin temperature of the band-like rubber member W at the time of forcing a part of band-like rubber member W on the rubber section 4 as 40-170 degrees C. It becomes that the adhesion of the band-like rubber member W and the rubber section 4 improves further, the band-like rubber member W sticks easily, and it is easy to be fixed by changing into the condition of having warmed the band-like rubber member W at 40 degrees C or more. Moreover, it is controlled by setting it as 170 degrees C or less that vulcanization of the unvulcanized-rubber constituent of the band-like rubber member W advances.

[0023] Although the band-like rubber member W of this invention may be the width of face covering the whole width-of-face surface of an unvulcanized tire and especially the size is not limited, as shown in drawing 1, a strip member with small width of face is twisted, and it may be made to make a free configuration form, and the strip band-like rubber member W extruded through the dice from the extruder or the rubber catapult may be twisted around the shaping drum 1 as it is, and may be manufactured. Although productive efficiency improves so that width of face and thickness are small, although not limited to the size especially when the band-like rubber member W is a strip member, it is good to set the width of face to 5-40mm, and to set thickness to 0.5-4mm preferably, from the band-like rubber member W becoming easy to go out, if too not much small.

[0024] Here, the band-like rubber member W may be a rubber member for inner liners of a tire, or may be a rubber member for side treads. Moreover, this invention can be used also for manufacture of various rubber goods other than a tire.

[0025] Although they are not limited that what is necessary is [ especially ] just what can fix the band-like rubber member W, when a mold-release characteristic is taken into consideration, as for the configuration and magnitude of the rubber section 4 of this invention, it is desirable to set up so that the die length of a

drum hoop direction may be further set to 5-20mm 60mm or less. Two or more at least one rubber section 4 may be formed, and it may arrange one pair of right and left so that the band-like rubber member W may be twisted around 2 coincidence like drawing 1 . Moreover, in order to make it easy to adhere the band-like rubber member W, mirror plane finishing may be given to the front face of the rubber section 4.

[0026] Furthermore, in order to make more reliable mold release of the band-like rubber member W, as shown in the front view (a) and sectional view (b) of a part of a segment 3 at drawing 3 , the mold release means 5 may be established. The mold release means 5 is embedded at a segment 3, and is constituted by the peripheral face of the shaping drum 1 free [ receipts and payments from the direction of the diameter of a drum ] by the cylinder style which is not illustrated. When the shaping drum 1 closes and it will be in a diameter reduction condition, while the mold release means 5 contacts the band-like rubber member W, it projects on the direction outside of the diameter of a drum, and the band-like rubber member W can be made to release from mold certainly from the rubber section 4 after fabricating an unvulcanized tire.

[0027]

[Example] It cannot be overemphasized that it is not what limits the range of this invention to these examples hereafter although an example explains this invention further.

[0028] The various shaping drums 1 which consist of a vulcanized-rubber constituent of combination (weight section) of the following table 1 and a degree of hardness and which laid the rubber section 4 with the thickness of 5mm, a drum cross direction die length [ of 120mm ], and a drum hoop direction die length of 15mm under the segment 3 as shown in drawing 1 were produced. As shown in drawing 2 , by about 45 Ns of loads, with the roller 11, force a point W1 on the rubber section 4, and this was made to carry out adhesion of the strip band-like rubber member W of the rubber constituent for tire side treads which uses natural rubber and styrene butadiene rubber as a principal component (2mm in width of face of 30mm, thickness), and it was stuck on it. The shaping drum 1 at this time had changed into the diameter expansion condition, and the skin temperature at the time of press of the band-like rubber member W was 60 degrees C. Next, shifting 100m location to which the band-like rubber member W is supplied so that it may become a part for /to drum shaft orientations, the full speed (full speed to which the band-like rubber member W is sent out) which the band-like rubber member W twists rotated the shaping drum 1, and twisted the band-like rubber member W. Furthermore, other tire configuration members were twisted one by one, lamination and the shaping drum 1 were closed in the diameter reduction condition, and the unvulcanized tire (first stage story which is half-finished products) was removed.

[0029] that by which the band-like rubber member W stuck, the situation was observed and the band-like rubber member W stuck to the rubber section 4 certainly at this time -- "O" and the thing which sticks and is inferior to a sex -- "x" -- carrying out -- Table 1 -- "-- it stuck and indicated as sex." Moreover, it indicated to Table 1, having used [ when removing an unvulcanized tire from the shaping drum 1, observed the mold-release characteristic, and ] as "x" what "O" band-like rubber member W sticks what the band-like rubber member W separated smoothly, and released from mold from the rubber section 4 to the rubber section 4, and is inferior to a mold-release characteristic. In addition, JIS written together all over Table 1 A degree of hardness is JIS. K It measured based on 6253.

[0030]

[Table 1]

表1

	比較例1	比較例2	比較例3	比較例4	実施例1	実施例2	実施例3	比較例5	比較例6
天然ゴム	100	50	50	—	—	20	—	—	—
ポリブタジエンゴム	—	50	—	—	—	—	—	—	—
スチレンブタジエンゴム	—	—	50	100	—	—	—	—	—
ブチルゴム	—	—	—	—	100	80	—	100	100
ブチルゴム	—	—	—	—	—	—	100	—	—
カーボンブラック	50	50	50	50	50	50	50	30	75
ステアリン酸	2	2	2	2	2	2	2	2	2
酸化亜鉛	3	3	3	3	3	3	3	3	3
アロマオイル	5	5	5	5	5	5	5	10	5
加硫促進剤DM	—	—	—	—	1	1	—	1	1
加硫促進剤TT	—	—	—	—	—	—	1	—	—
加硫促進剤CZ	1.5	1.5	1.5	1.5	—	—	—	—	—
硫黄	2	2	2	2	1	1	1.5	1	1
JIS A硬度	59	54	58	57	52	52	53	38	65
貼り付き性	○	○	○	○	○	○	○	○	×
離型性	×	×	×	×	○	○	○	×	○

[0031] The following were used for each component used for the above-mentioned table 1.

natural rubber: -- RSS#3 polybutadiene rubber: -- NIPOL 1220, styrene-butadiene-rubber [ by Nippon Zeon / Co., Ltd. / Co., Ltd. ];NIPOL 1502, BUROMO isobutylene-isoprene-rubber [ by Nippon Zeon / Co., Ltd. / Co., Ltd. ];Bromobutyl X2, Bayer isobutylene-isoprene-rubber:Butyl 268, carbon black [ by the Exxon chemistry company ];DIA G, Mitsubishi Chemical zinc oxide: Three sorts of zinc oxides, vulcanization-accelerator DM[ by forward Anabolism Study Industrial company ];Nocceler DM, vulcanization-accelerator TT[ by the Ouchi Shinko Chemical industrial company ];Nocceler TT, the vulcanization accelerator CZ by the Ochi promotion chemical-industry company: Nocceler CZ, the Ochi promotion chemical-industry company make [0032] As shown in the above-mentioned table 1, although the examples 1-4 of a comparison which did not use the rubber which uses isobutylene isoprene rubber as a principal component were satisfactory, they were extremely inferior to mold releasability about the sex by sticking. Temporarily, supposing it pushes and forces a band-like rubber member by \*\*, there is a weaker problem that stick conversely, and a sex falls, and does not stabilize and stick, so that it may be easy to release from mold. Moreover, the example 5 of a comparison which is too small was inferior to the mold-release characteristic, the example 6 of a comparison which is too large conversely stuck, and the sex has got worse. The examples 1-3 of this invention stuck to it, and both the sex and the mold-release characteristic were very good.

[0033]

[Effect of the Invention] JIS which carries out 60-100 weight section content of the butyl system rubber to the rubber 100 weight section at a drum peripheral face according to this invention The approach the band-like rubber member which can perform the attachment and mold release to a shaping drum easily should stick, and a shaping drum can be obtained without making a band-like rubber member deform too much by using the shaping drum which prepared the rubber section which A degree of hardness becomes from the rubber constituent which are 40-60.

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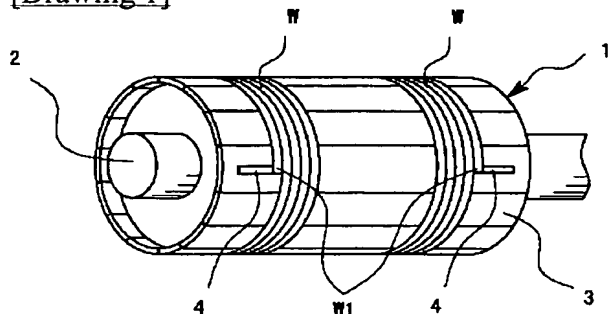
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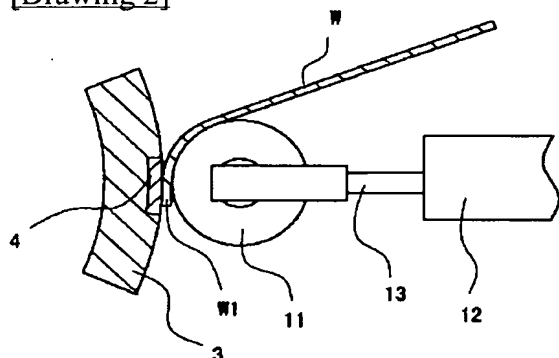
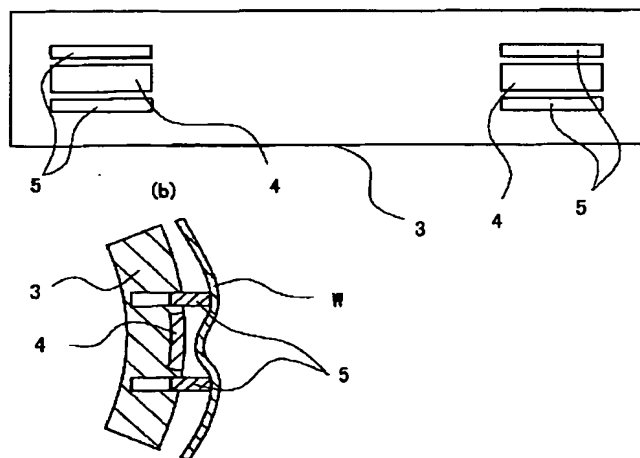
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## DRAWINGS

[Drawing 1]



[Drawing 2]

[Drawing 3]  
(a)

[Translation done.]



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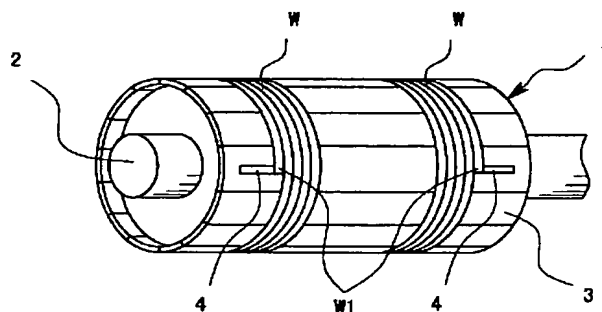
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(54) 【発明の名称】 帯状ゴム部材の貼り付け方法および成形ドラム

(57) 【要約】

【課題】 帯状ゴム部材を過度に変形させることなく、容易に成形ドラムへの貼り付けと離型を行うことができる帯状ゴム部材の貼り付け方法および成形ドラムを提供する。

【解決手段】 未加硫の帯状ゴム部材の一部を成形ドラムの表面に設けたゴム部に押し付けて固定した後に、前記帯状ゴム部材を成形ドラムの外周面に巻き付けるとともに、前記ゴム部がゴム100重量部に対しブチル系ゴムを60～100重量部含有するJ I S A硬度が40～60であるゴム組成物からなる帯状ゴム部材の貼り付け方法およびその成形ドラム。



## 【特許請求の範囲】

【請求項1】 未加硫の帯状ゴム部材の一部を成形ドラムの表面に設けたゴム部に押し付けて固定した後に、前記帯状ゴム部材を成形ドラムの外周面に巻き付けるとともに、前記ゴム部がゴム100重量部に対しブチル系ゴムを60～100重量部含有するJIS A硬度が40～60であるゴム組成物からなる帯状ゴム部材の貼り付け方法。

【請求項2】 前記帯状ゴム部材がタイヤ用ゴム部材である請求項1に記載の帯状ゴム部材の貼り付け方法。

【請求項3】 前記帯状ゴム部材がタイヤのインナーライナー用ゴム部材またはサイドトレッド用ゴム部材である請求項1に記載の帯状ゴム部材の貼り付け方法。

【請求項4】 前記帯状ゴム部材の巻き付ける最高速度が、30～200m/分である請求項1～3のいずれか1項に記載の帯状ゴム部材の貼り付け方法。

【請求項5】 前記帯状ゴム部材の一部を成形ドラムの表面に設けたゴム部に押し付ける際の帯状ゴム部材の表面温度が、40～170℃である請求項1～4のいずれか1項に記載の帯状ゴム部材の貼り付け方法。

【請求項6】 前記帯状ゴム部材の幅が5～40mm、厚さが0.5～4mmである請求項1～5のいずれか1項に記載の帯状ゴム部材の貼り付け方法。

【請求項7】 帯状ゴム部材を貼り付ける成形ドラムであって、その外周面にゴム部を設け、そのゴム部がゴム100重量部に対しブチル系ゴムを60～100重量部含有するJIS A硬度が40～60であるゴム組成物からなる成形ドラム。

【請求項8】 前記ゴム部のドラム周方向の長さが60mm以下である請求項7に記載の成形ドラム。

【請求項9】 前記成形ドラムの外周面に、ドラム径方向に出し入れ自在な離型手段を設けた請求項7または請求項8に記載の成形ドラム。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、帯状ゴム部材の貼り付け方法および成形ドラムに関し、さらに詳しくは、帯状ゴム部材を過度に変形させることなく、容易に成形ドラムへの貼り付けと離型を行うことができる帯状ゴム部材の貼り付け方法および成形ドラムに関する。

## 【0002】

【従来の技術】通常、タイヤを製造するにあたり、タイヤを構成する未加硫の各種帯状ゴム部材を成形ドラムに順次巻き付けて貼り付け、未加硫タイヤを作製する。例えば、成形ドラムに、まず、ブチルゴムを主成分としたインナーライナー用のゴム部材からなる帯状ゴム部材を巻き付け、その上にカーカス、リムクッション、サイドトレッド等の部材を順次巻き付けて組み立てていくことで未加硫タイヤを作製する。また、その逆に、最初に、成形ドラムにサイドトレッド用のゴム部材からなる帯状

ゴム部材を巻き付け、その上にリムクッション、インナーライナー、カーカス等の部材を順次巻き付けて未加硫タイヤを作製する。

【0003】このプロセスにおいて最初に帯状ゴム部材を金属製の成形ドラムに巻き付けるためには、帯状ゴム部材の先端部を成形ドラム表面に押し付けて固定したうえで、成形ドラムを回転させて貼り付ける必要がある。また一方で、作製した未加硫タイヤや半製品である第一段階未加硫タイヤを成形ドラムから取り外すためには、成形ドラムに固定された帯状ゴム部材の先端部分は容易にドラム表面から剥がれる必要がある。

【0004】従来は、この課題を解決するために、帯状ゴム部材の先端部を貼り付ける成形ドラムの表面に硬質クロームメッキを施して平滑性を高めたり、バキュームパット等の吸引手段を配置して帯状ゴム部材を吸引吸着する方法が行われていた。

【0005】しかしながら、これらの方法では種々の問題があり、特に帯状ゴム部材の幅が小さくなるほど実用が困難なものであった。硬質クロームメッキを施す場合においては、単位面積当たりのゴムの凝着力が小さく成形ドラムに固定されにくいために、より広い貼り付け面積を必要とするとともに、貼り付け面に対して帯状ゴム部材を強い力で押し付け、ゴムが成形ドラム面に強固に密着させる必要があった。そうすると、帯状ゴム部材が強く押された部分は厚みが小さくなるように変形し、その他の部分に比べ帯状ゴム部材の形状や厚みが変化して不均一になってしまうという欠点があり、タイヤ加硫後のエア溜りの発生につながってしまった。また、成形ドラムのメッキ表面を常に平滑に維持する必要があり、その保全のために手間がかかってしまうという問題があった。

【0006】一方、バキュームパット等で吸引吸着させて貼り付ける方法においては、製造するタイヤのサイズが変わり帯状ゴム部材の貼り付け位置が変化した場合には、それに合わせてバキュームパットの位置も変更したり、ゴムが当接しないバキュームパットを閉塞させなければならず手間がかかり作業性が悪化してしまった。さらには、帯状ゴム部材がバキュームパッドに吸引されて過度に変形してしまい、加硫後の完成タイヤでエア溜りの故障の原因になるという問題もあった。

【0007】そこで、本出願人は、特開平7-40460号公報で、成形ドラムの表面に鏡面仕上げを施したゴム部を設け、そのゴム部に帯状ゴム部材の先端を押し付けて貼り付けるという方法を提案している。しかし、この方法を用いると、帯状ゴム部材が強固にゴム部材に貼り付けられてしまい、作製した未加硫タイヤを取り外す際の離型をスムーズに行うことができないということが発生することがあり、帯状ゴム部材の貼り付けと離型を常時ともに容易に行える方法が望まれていた。

【0008】

【発明が解決しようとする課題】従って、本発明の課題は、帯状ゴム部材を過度に変形させることなく、容易に成形ドラムへの貼り付けと離型を行うことができる帯状ゴム部材の貼り付け方法および成形ドラムを提供することにある。

#### 【0009】

【課題を解決するための手段】本発明によれば、未加硫の帯状ゴム部材の一部を成形ドラムの表面に設けたゴム部に押し付けて固定した後に、前記帯状ゴム部材を成形ドラムの外周面に巻き付けるとともに、前記ゴム部がゴム100重量部に対しブチル系ゴムを60～100重量部含有するJIS A硬度が40～60であるゴム組成物からなる帯状ゴム部材の貼り付け方法が提供される。

【0010】また、本発明によれば、前記帯状ゴム部材がタイヤ用ゴム部材、さらに好ましくは、タイヤのインナーライナー用ゴム部材またはサイドトレッド用ゴム部材である前記の帯状ゴム部材の貼り付け方法が提供される。

【0011】また、本発明によれば、帯状ゴム部材を貼り付ける成形ドラムであって、その外周面にゴム部を設け、そのゴム部がゴム100重量部に対しブチル系ゴムを60～100重量部含有するJIS A硬度が40～60であるゴム組成物からなる成形ドラムが提供される。

【0012】また、本発明によれば、前記ゴム部のドラム周方向の長さが60mm以下である前記の成形ドラムが提供される。

【0013】さらに、本発明によれば、前記成形ドラムの外周面に、ドラム径方向に出し入れ自在な離型手段を設けた前記の成形ドラムが提供される。

#### 【0014】

【発明の実施の形態】以下、本発明の構成について図面を参照しながら詳細に説明する。図1は、本発明の成形ドラムの一例の概略を示し、帯状ゴム部材を巻き付けている状態の斜視図である。

【0015】成形ドラム1は、水平方向に延長する回転自在に保持されるドラム駆動軸2に、図示しない任意の駆動手段によってセグメント3をドラム径方向に拡張自在となるように取り付けられている。セグメント3の駆動手段は、特に限定されないが、例えば、ドラム軸方向の駆動力をリンク機構や傾斜板を介してドラム径方向の駆動力に変換する公知の駆動手段を用いることができる。セグメント3はアルミニウム合金等の金属材料から構成され、その外表面にゴムの粘着を回避できるように離型処理が施されている。この離型処理としては、例えば、フッ素樹脂やシリコン樹脂による表面処理を施したり、粗面加工を施したりすればよい。

【0016】セグメント3の表面には、ゴム部4が少なくとも帯状ゴム部材Wの先端部W1が当接する箇所に配設されており、ここに帯状ゴム部材Wの先端部W1が押

し付けられて固定される。このゴム部4は、ゴム100重量部に対しブチル系ゴムを60～100重量部含有するとともに、JIS A硬度が40～60と硬度の小さい加硫されたゴム組成物から構成されている。このように、構成することで、未加硫の帯状ゴム部材Wとゴム部4の加硫ゴム組成物との凝着力が向上し、帯状ゴム部材Wがゴム部4に容易に貼り付いて固定されやすくなるとともに、未加硫タイヤが作製されて成形ドラム1から取り外される際にも容易に離型されるという極めて良好な成形ドラムが得られる。さらには、過度に押し付けなくても容易に貼り付くので、帯状ゴム部材Wの変形を抑制することができる。また、ウレタン樹脂等の上記ゴム以外の材料ではゴムとの親和性に乏しく、安定した貼り付き性能が得られない。

【0017】本発明のブチル系ゴムとしては、ブチルゴム(IIR)、プロモブチルゴム、クロロブチルゴム等を挙げることができる。また、ブチル系ゴム以外の任意のジエン系ゴムをブレンドすることができ、例えば、天然ゴム(NR)、ポリイソプレンゴム(IR)、スチレンブタジエンゴム(SBR)、ポリブタジエンゴム(BR)、アクリロニトリルブタジエンゴム(NBR)等を挙げることができる。

【0018】なお、ブチル系ゴムの配合量がゴム100重量部に対し60重量部未満であると、帯状ゴム部材がゴム部から離型しにくくなってしまふ。また、JIS A硬度が40未満であると、ゴム部が軟らかすぎて帯状ゴム部材がゴム部から離型しにくくなってしまい、逆に60を超えるとゴム部が硬すぎて凝着力が低下し帯状ゴム部材がゴム部に貼り付きにくくなってしまふ。

【0019】次に、上記の成形ドラム1を用いた帯状ゴム部材の貼り付け方法を説明する。まず、図1に示すように、帯状ゴム部材Wの一部すなわち先端部W1を拡張状態の成形ドラム1のゴム部4に押し付けて固定させる。ここでは、押出機またはゴム射出機からダイスを経て押し出された左右1対のストラップ状の帯状ゴム部材Wを、ドラム幅方向外側から内側に向かって巻き付けるものである。図2は、ゴム部4を埋設したセグメント3の部分を示す拡大断面図であるが、帯状ゴム部材Wがローラー11によってゴム部4に押し付けられ、先端部W1がゴム部4に粘着し固定される。このローラー11は、シリンダ12から伸縮自在なロッド13の先端に取り付けられている。

【0020】さらに、帯状ゴム部材Wがローラー11によって押し付けられた状態で、帯状ゴム部材Wの供給される位置をドラム軸方向にずらしながら、成形ドラム1を回転させて、帯状ゴム部材Wを成形ドラムに巻き付けて貼り付け、最後に帯状ゴム部材Wの後端部を切断する。その後、他の帯状ゴム部材も順次巻き付けて、未加硫タイヤを成形したら、成形ドラム1を縮径状態にして取り出す。

【0021】本発明の帯状ゴム部材の貼り付け方法においては、製造条件等は特に限定されず、適宜設定することができるが、帯状ゴム部材Wの巻き付ける速度は、帯状ゴム部材Wが供給される最高速度として、30～200m/分とするのが好ましい。30m/分以上と高速とすることで、製造効率を向上させることができ、特に帯状ゴム部材Wが幅が小さいストリップ状部材である場合には、特に好ましい。逆に、200m/分以下とすることで、高速すぎて帯状ゴム部材Wが遠心力によって浮き上がる等の不具合を防止することができる。

【0022】また、帯状ゴム部材Wの一部をゴム部4に押し付ける際の帯状ゴム部材Wの表面温度を40～170℃に設定するのが好ましい。40℃以上に帯状ゴム部材Wを暖めた状態にすることで、帯状ゴム部材Wとゴム部4との凝着力がさらに向上し、帯状ゴム部材Wが容易に貼り付いて固定されやすくなる。また、170℃以下に設定することで、帯状ゴム部材Wの未加硫ゴム組成物の加硫が進行することが抑制される。

【0023】本発明の帯状ゴム部材Wは、未加硫タイヤの幅全面にわたる幅であってもよく、そのサイズは特に限定されないが、図1に示すように、幅が小さいストリップ状部材を巻き付けて自在の形状を形成させるようにしてもよく、押出機またはゴム射出機からダイスを経て押し出されたストリップ状の帯状ゴム部材Wをそのまま成形ドラム1に巻き付けて製造してもよい。帯状ゴム部材Wがストリップ状部材である場合には、そのサイズには、特に限定されないが、幅や厚さが小さいほど生産効率が向上するが、あまり小さすぎると帯状ゴム部材Wが切れやすくなるということから、好ましくは、その幅を5～40mm、厚さを0.5～4mmとするのがよい。

【0024】ここで、帯状ゴム部材Wは、タイヤのインナーライナー用ゴム部材であっても、サイドトレッド用ゴム部材であってもよい。また、本発明は、タイヤ以外の各種ゴム製品の製造にも用いることができる。

【0025】本発明のゴム部4の形状や大きさは、帯状ゴム部材Wを固定できるものであればよく特に限定されないが、離型性を考慮するとドラム周方向の長さが60mm以下、さらには、5～20mmとなるように設定するのが好ましい。ゴム部4は、1個でも複数個設けてもよく、図1のように帯状ゴム部材Wを2本同時に巻き付けられるように左右1対を配設してもよい。また、帯状ゴム部材Wを粘着しやすくするために、ゴム部4の表面に鏡面仕上げを施してもよい。

【0026】さらには、帯状ゴム部材Wの離型をより確

実にするために、図3にセグメント3の部分の正面図(a)と断面図(b)に示されるように、離型手段5を設けてもよい。離型手段5は、セグメント3に埋め込まれ、図示しないシリンダ機構等により成形ドラム1の外周面にドラム径方向に出し入れ自在に構成されている。未加硫タイヤを成形後、成形ドラム1が閉じて縮径状態になるときに、離型手段5が帯状ゴム部材Wに当接しながらドラム径方向外側に突き出され、帯状ゴム部材Wをゴム部4から確実に離型させることができる。

10 【0027】

【実施例】以下、実施例によって本発明をさらに説明するが、本発明の範囲をこれらの実施例に限定するものではないことは言うまでもない。

【0028】下記表1の配合(重量部)と硬度の加硫ゴム組成物からなる、厚さ5mm、ドラム幅方向長さ120mm、ドラム周方向長さ15mmのゴム部4を、図1に示すようにセグメント3に埋設した各種成形ドラム1を作製した。これに、図2に示されるように、天然ゴムとスチレンブタジエンゴムを主成分とするタイヤサイドトレッド用ゴム組成物のストリップ状の帯状ゴム部材W(幅30mm、厚さ2mm)を荷重約45Nでローラー11によって、先端部W1をゴム部4に押し付けて凝着させて貼り付けた。このときの成形ドラム1は拡径状態になっており、帯状ゴム部材Wの押圧時の表面温度は60℃であった。次に、帯状ゴム部材Wの巻き付ける最高速度(帯状ゴム部材Wが送り出される最高速度)が、100m/分となるように、帯状ゴム部材Wの供給される位置をドラム軸方向にずらしながら、成形ドラム1を回転させ帯状ゴム部材Wを巻き付けた。さらに、他のタイヤ構成部材を順次巻き付けて貼り合せ、成形ドラム1を縮径状態に閉じて(半製品である第一段階の)未加硫タイヤを取り外した。

【0029】このとき、帯状ゴム部材Wの貼り付き状況を観察し、帯状ゴム部材Wがゴム部4に確実に貼り付いたものを「○」、貼り付き性に劣るものを「×」として、表1に「貼り付き性」として記載した。また、未加硫タイヤを成形ドラム1から取り外す際に離型性を観察し、ゴム部4から帯状ゴム部材Wがスムーズに外れて離型したものを「○」、帯状ゴム部材Wがゴム部4に貼り付いて離型性に劣るものを「×」として、表1に記載した。なお、表1中に併記したJIS A硬度は、JIS K 6253に準拠して測定した。

【0030】

【表1】

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表1

	比較例1	比較例2	比較例3	比較例4	実施例1	実施例2	実施例3	比較例5	比較例6
天然ゴム	100	50	50	—	—	20	—	—	—
ポリブタジエンゴム	—	50	—	—	—	—	—	—	—
スチレンブタジエンゴム	—	—	50	100	—	—	—	—	—
ブロモブチルゴム	—	—	—	—	100	80	—	100	100
ブチルゴム	—	—	—	—	—	—	100	—	—
カーボンブラック	50	50	50	50	50	50	50	30	75
ステアリン酸	2	2	2	2	2	2	2	2	2
酸化亜鉛	3	3	3	3	3	3	3	3	3
アロマオイル	5	5	5	5	5	5	5	10	5
加硫促進剤DM	—	—	—	—	1	1	—	1	1
加硫促進剤TT	—	—	—	—	—	—	1	—	—
加硫促進剤CZ	1.5	1.5	1.5	1.5	—	—	—	—	—
硫黄	2	2	2	2	1	1	1.5	1	1
JIS A硬度	59	54	58	57	52	52	53	38	65
貼り付き性	○	○	○	○	○	○	○	○	×
離型性	×	×	×	×	○	○	○	×	○

【0031】上記表1に使用した各成分は、以下のものを使用した。

天然ゴム：RSS#3

ポリブタジエンゴム：NIPOL 1220、日本ゼオン（株）社製

スチレンブタジエンゴム：NIPOL 1502、日本ゼオン（株）社製

ブロモブチルゴム：Bromobutyl X2、バイエル社製

ブチルゴム：Butyl 268、エクソン化学社製

カーボンブラック：DIA G、三菱化学社製

酸化亜鉛：酸化亜鉛3種、正同化学工業（株）社製

加硫促進剤DM：ノクセラーDM、大内新興化学工業社製

加硫促進剤TT：ノクセラーTT、大内新興化学工業社製

加硫促進剤CZ：ノクセラーCZ、大内新興化学工業社製

【0032】上記表1に示すように、ブチルゴムを主成分とするゴムを用いなかった比較例1～4は、貼り付き性に関しては問題ないものの、離型性に極めて劣った。

仮に、離型しやすいようにより弱い押し圧で帯状ゴム部材を押し付けるとすると、逆に貼り付き性が低下して安定して貼り付かないという問題がある。また、ゴムの硬度が小さすぎる比較例5は、離型性に劣り、逆にゴムの

硬度が大きすぎる比較例6は、貼り付き性が悪化してしまった。それに対して、本発明の実施例1～3は、貼り付き性、離型性がともに極めて良好であった。

【0033】

【発明の効果】本発明に従って、ドラム外周面にゴム100重量部に対しブチル系ゴムを60～100重量部含有するJIS A硬度が40～60であるゴム組成物からなるゴム部を設けた成形ドラムを用いることによって、帯状ゴム部材を過度に変形させることなく、容易に成形ドラムへの貼り付けと離型を行うことができる帯状ゴム部材の貼り付け方法および成形ドラムを得ることができる。

【図面の簡単な説明】

【図1】成形ドラムの斜視図である。

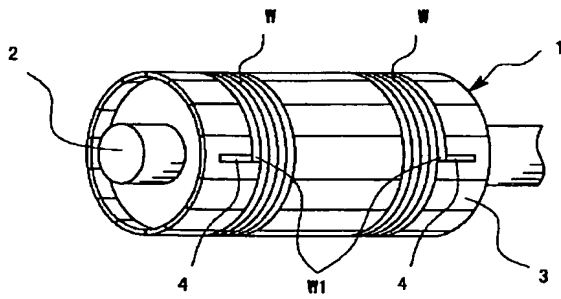
【図2】セグメントの拡大断面図である。

【図3】セグメントの正面図（a）と断面図（b）である。

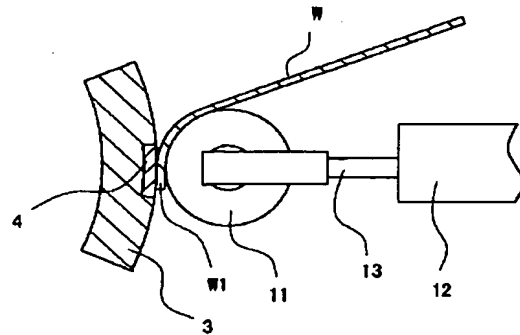
【符号の説明】

- 1 成形ドラム
- 2 ドラム駆動軸
- 3 セグメント
- 4 ゴム部
- 5 離型手段
- W 帯状ゴム部材
- W1 先端部

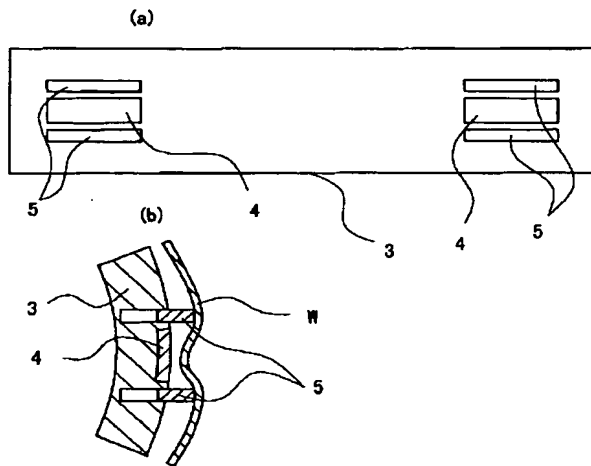
【図1】



【図2】



【図3】



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